

Atty. Dkt.: MAE 292

**SPECIFICATION AMENDMENTS:**

Please replace the paragraph on page 1, lines 5 through 7, with the following amended paragraph:

--The present invention relates to a semiconductor device fabrication method, and more particularly to the isolation steps in the fabrication method.--

Please replace the paragraph on page 2, lines 12 through 26, with the following amended paragraph:

--For SOI devices, accordingly, alternative isolation methods have been tried, such as the mesa isolation method, in which a thin layer of silicon is etched to form isolated mesas of silicon on an insulating layer. The etching process is illustrated in FIGs. 5A and 5B. An SOI substrate 200 comprising a silicon supporting layer 202, a buried oxide layer 204, and a silicon semiconductor layer 206 is covered with a photoresist film 212 which is patterned by photolithography as shown in FIG. 5A to define the mesa shapes. The silicon semiconductor layer 206 is then etched, with the patterned photoresist functioning as an etching mask. FIG. 5B shows the adjacent parts of two mesas after the photoresist mask has been removed and the surface cleansed. The etching process also removes part of the buried oxide layer 204.--

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Please replace the paragraph bridging pages 4 and 5 with the following amended paragraph:

--FIGs. 1A and 1B illustrate the isolation steps in a first embodiment of the invention. An SOI substrate 100 comprising a silicon supporting substrate 102, a buried oxide layer 104, and a silicon layer 106 twenty to seventy nanometers thick is thermally oxidized to form a sacrificial oxide film or pad oxide film 108 five to fifty nanometers thick. This thermal oxidation process reduces the thickness of the silicon layer 106 by an amount that can be precalculated; the thicknesses of the silicon layer 106 and pad oxide film 108 should be selected so that the remaining thickness of the silicon layer 106 and the thickness of the pad oxide film 108 are adequate for later fabrication steps. Next, a nitride film 110 ten to three hundred fifty nanometers thick is formed by chemical vapor deposition (CVD). The purpose of the pad oxide film 108 is to prevent direct contact between the silicon layer 106 and the nitride film 110. The surface of the nitride film 110 is then coated with a photoresist film 112, which is patterned by photolithography to define oxygen ion implantation regions. The nitride film 110 and photoresist film 112 are both oxidation-resistant. The nitride film 110 is then etched, the photoresist film 112 being used as a mask, to expose the pad oxide film 108 in the oxygen ion implantation areas. ~~Depending on the ion implantation conditions, the pad oxide film 108 may also be etched, exposing the silicon layer 106.~~ In FIG. 1A, the pad oxide film 108 is not etched. After the etching process, oxygen ions are implanted into the silicon layer 106, with the nitride film 110 and photoresist film

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112 both acting as masks. In FIG. 1A, the oxygen ions are implanted through the pad oxide film 108 with an accelerating voltage of, for example, five kilovolts (5 kV) and a concentration of  $10^{14}$  ions/cm<sup>2</sup> into the region 114 of the silicon layer 106 disposed below the openings in the nitride film 110 and photoresist film 112.--

Please replace the paragraph on page 7, lines 21 through 34, with the following amended paragraph:

--FIGs. 3A to 3C illustrate the isolation steps in a third embodiment of the invention. The isolation process in the third embodiment begins as described in the first embodiment and proceeds in an identical manner through the etching of the nitride film 110. Next, the photoresist film 112 (shown in FIG. 1A) is removed and a nitride film 110 is deposited on the entire surface. This nitride film is etched anisotropically, without a mask, leaving nitride sidewalls 118 on the inner walls of the openings in the nitride film 110, as shown in FIG. 3A. Oxygen ions are then implanted with an accelerating voltage of, for example, 5 kV and a concentration of  $10^{14}$  ions/cm<sup>2</sup> into a region 114 in the silicon layer 106, with the nitride film 110 and sidewalls 118 functioning as a mask, as indicated by the arrows in FIG. 3A.--

Please replace the paragraph on page 8, lines 16 through 18, with the following amended paragraph:

--The sidewalls 118 of the third embodiment can also be formed when the ~~pad oxide~~ nitride film 408 110 is absent as in the second embodiment.--

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